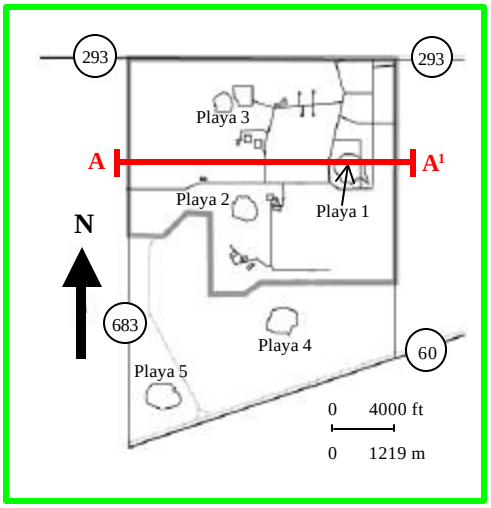
Vadose Zone Fact Sheet
Pantex Plant

Background: The Pantex Plant is located in the southern high plains of the Texas Panhandle, approximately 27 km (17 mi) northeast of downtown Amarillo. The site consists of approximately 6,500 hectares (16,000 acres). The mission of Pantex involves fabricating high explosives for nuclear weapons, assembling nuclear weapons, maintaining and evaluating nuclear weapons in the stockpile, and dismantling nuclear weapons as they are retired from the stockpile. At present, the principal operation is disassembly of nuclear weapons. The production of explosive components has resulted in the contamination of soils and ground water primarily by organic solvents and explosives. In addition, tests of weapons components have contaminated some areas with explosives and heavy metals.



Issues: No major vadose zone issues.

Vadose zone infiltration: Playa basins collect discharge and both natural and runoff precipitation. Water in the playas that is not lost to precipitation can infiltrate down to the perched zone.

Vadose zone characterization/remediation: Remediation efforts being undertaken consist of excavation of contaminated soils and underground tanks, and operation of soil vapor extraction and venting treatment systems.

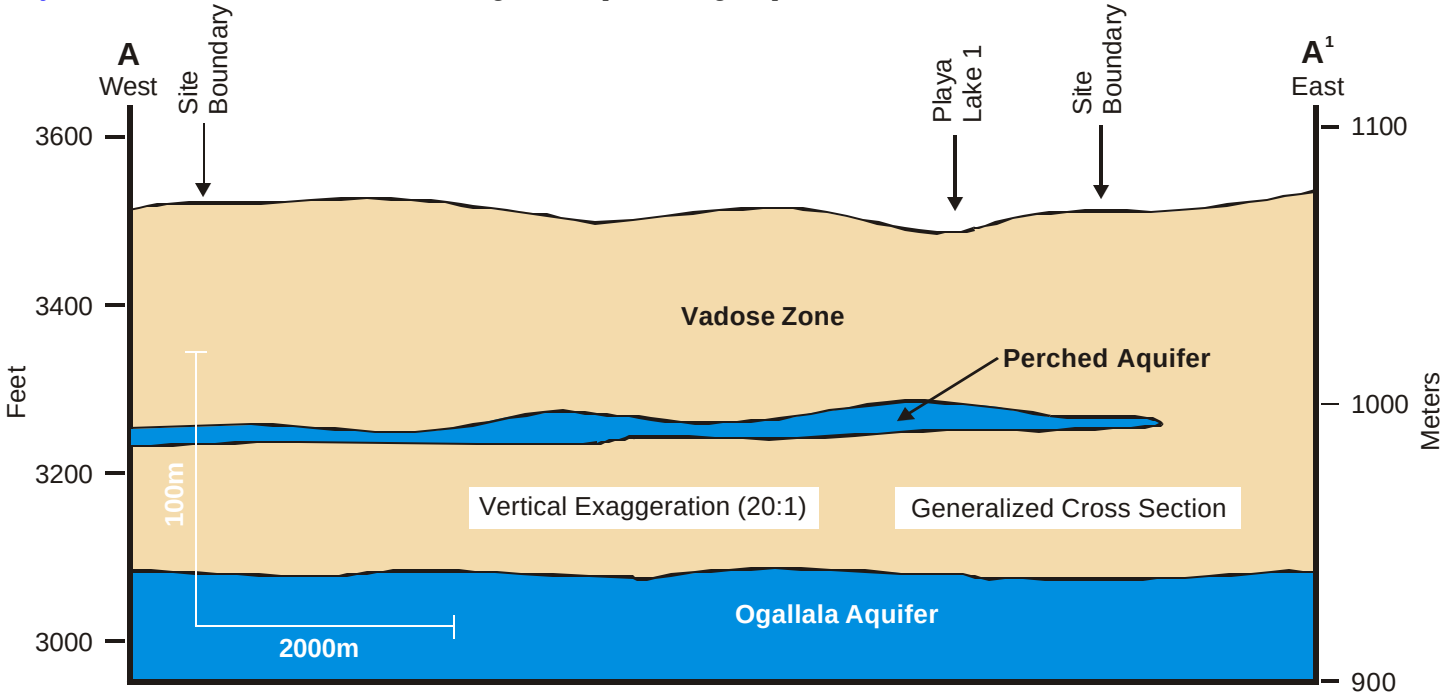
Precipitation: Average precipitation is 50 cm (20 in) per year.

Surface waters: There are no streams or rivers in the vicinity of Pantex. Most surface water runoff from the plant flows into Playa Basins 1, 2, 3, and 4 via several major drainage ditches. Playa Basin 5 does not receive runoff from the site. Playa Basin 6, located 2.5 miles north of the site, had received treated wastewater in the past.

Geology: The Pantex plant lies at an average elevation of 1067 m (3,500 ft) on relatively flat topography. Unconsolidated sediments range in thickness from 15 to 24 m (50 to 80 ft) over the Ogallala Formation, which consists of alluvial sands, silts, clays, gravels, and several caliche layers.

Vadose zone thickness: Depth to the Ogallala Aquifer, the regional aquifer, is approximately 131 m (430 ft). A perched aquifer lies 30 to 46 m (100 to 150 ft) above the Ogallala Aquifer.

Major contaminants of concern: Volatile organic compounds, high explosives, low level radioactive contamination, metals.



September 2000

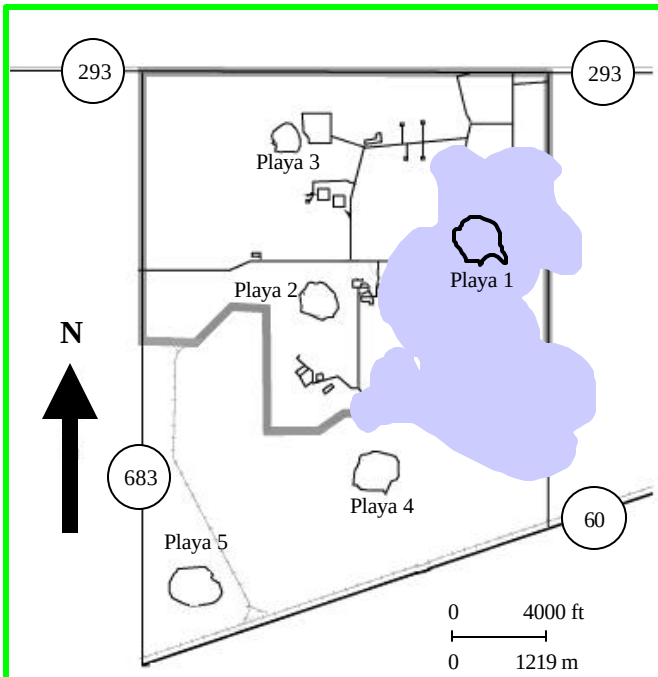
Ground Water Fact Sheet
Pantex Plant

Background: The Pantex Plant is located in the southern high plains of the Texas Panhandle, approximately 27 km (17 mi) northeast of downtown Amarillo. The site consists of approximately 6,500 hectares (16,000 acres). The mission of Pantex involves fabricating high explosives for nuclear weapons, assembling nuclear weapons, maintaining and evaluating nuclear weapons in the stockpile, and dismantling nuclear weapons as they are retired from the stockpile. At present, the principal operation is disassembly of nuclear weapons. The production of explosive components has resulted in the contamination of soils and ground water primarily by organic solvents and explosives. In addition, tests of weapons components have contaminated some areas with explosives and heavy metals.

Hydrogeology: Ground water below Pantex occurs in two aquifers: a shallow perched aquifer and the deeper Ogallala Aquifer. Analytical data obtained over the last few years indicate that ground water contamination occurs only in the perched aquifer. The Ogallala Aquifer is a major regional aquifer in the western United States, and is the primary source of potable water for Pantex and the City of Amarillo. Ground water flow locally in the Ogallala is to the north. The perched aquifer underlies a portion of the site and ranges in thickness from zero to 15 m (50 ft).

Issues: Ground water contamination has been detected on- and off-site in the perched aquifer, which is located above the Ogallala Aquifer.

Ground water characterization/remediation: A pump and treat remedial approach is being taken that will render the water below drinking water standards, but the water will likely be used for industrial purposes. Some sites will require further monitoring after a treatment plan has been initiated. The deep Ogallala Aquifer can be protected from overlying contaminated perched water by plugging all homestead wells and continued monitoring.



Extent of Ground Water Contamination in the Perched Aquifer

Ground water use: The Ogallala Aquifer is the primary water source for the region. The perched aquifer is not a drinking water source.

Plume Designation	Primary Contaminants	Depth	Remedial Approach
1	RDX	82 m (270 ft)	P&T; GAC
2	HMX	82 m (270 ft)	P&T; GAC
3	2,4,6-Trinitrotoulene (TNT)	82 m (270 ft)	P&T; GAC
4	2,4-Dinitrotoluene (2,4 DNT)	82 m (270 ft)	P&T; GAC
5	Hexavalent chromium	82 m (270 ft)	P&T; Chemical precipitation
6	Trichloroethylene (TCE)	82 m (270 ft)	P&T; GAC

RDX and HMX are high explosives; P&T = pump and treat; GAC = granular activated carbon